
DMS-4510

Mechanical Couplers for Reinforcing Steel

Effective Date: **January 2022**



1. DESCRIPTION

This Specification governs the pre-qualification procedure, materials, composition, quality, testing, and project sampling of mechanical couplers for reinforcing steel.

2. MATERIAL PRODUCER LIST

The Materials and Tests Division (MTD) maintains the Material Producer List (MPL) of all materials conforming to the requirements of this Specification. Materials appearing on the MPL, entitled "[Mechanical Couplers](#)," require project sampling and testing in accordance with Article 6, "Material Requirements," of this Specification before use.

3. BIDDERS' AND SUPPLIERS' REQUIREMENTS

The Department will only purchase or allow on projects those products listed by producer and product code or designation shown on the MPL.

Use of pre-qualified product does not relieve the Contractor of the responsibility to provide product that meets this Specification. The Department may inspect or test material at any time and reject any material that does not meet the specifications.

Note: Transitional couplers are pre-qualified individually. For example, pre-qualified No. 9 and No. 11 couplers does not constitute a pre-qualified No. 9 to No. 11 transitional coupler.

4. PRE-QUALIFICATION PROCEDURE

4.1. **Pre-Qualification Request.** Submit a request for evaluation under DMS-4510 to DMS_Prequal@txdot.gov.

Include the following information in the request:

- company name;
- physical and mailing addresses;
- contact person, phone number, and email address;
- product information such as bar size, up-threading, or any other distinguishing characteristics.

4.2. **Pre-Qualification Sample.** Submit the following samples to the Texas Department of Transportation, MTD (CP51), 9500 North Lake Creek Parkway, Austin, TX 78717.

- Four fully assembled mechanical coupler assemblies for each type, model, bar size, and grade intended for pre-qualification. See Test Method [Tex-744-I](#) for required length.
 - **The connecting reinforcing steel must meet the requirements of the Department's Specification Item 440, "Reinforcement for Concrete,"** and come from a pre-approved source listed on the MPL entitled "Reinforcing Steel Mills." Mechanical coupler assemblies submitted with two different grades of steel reinforcing will be tested to meet the requirements of Article 6, "Required Materials," of this Specification relative to the lower grade bar.

- The connecting reinforcing steel should be straight and uniaxial to the assembly. Bent bars or bars that are not uniaxial may cause erroneously large slip readings caused by the action of straightening the bar during the performance of the Slip test.
- One completely unassembled coupler body.
- Furnish the threaded connecting bars when the connecting reinforcing steel is threaded, otherwise do not furnish the connecting reinforcing steel with the unassembled coupler body.

Include the following with the sample:

- completed [Form 1818](#) (a.k.a. Form D-9-USA-1), "Material Statement," with the proper attachments in accordance with Item 6, "Control of Materials," of the Department's *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges*;
- certified test reports showing the couplers meet the requirements of Article 6, "Required Materials," of this Specification;
- written instructions provided by the manufacturer to machine shops for operations such as threading or swaging of reinforcing steel;
- written assembly and installation instructions provided by the manufacturer to Contractors for each type, model, bar size, and grade for which the coupler assembly is designed, including a list of required tools, bar preparation, and necessary torque ranges for proper assembly and installation;
- mill test reports for each size and grade of reinforcing steel used for the connecting bars;
- breakdown of the format used for die stamping, if applicable.

Submit all materials for pre-qualification at no cost to the Department.

- 4.3. **Evaluation.** The Department will test assembled specimens in accordance with [Tex-744-I](#). If there is any variance between the results provided by the producer and the results of the Department's tests, the Department's tests will govern. MTD will notify prospective bidders and suppliers after completion of material evaluation.

- 4.3.1. **Qualification.** If all four of the assembled pre-qualification specimens meet the requirements listed in Article 6, "Required Materials," of this Specification, MTD will add the material to the MPL.

Report changes in the composition or in the manufacturing process of any material to MTD. Significant changes reported by the producer, such as changes in materials, design, or assembly instructions, as determined by the Director of MTD, may require a re-evaluation of performance. The Department reserves the right to conduct whatever tests it deems necessary to identify a pre-qualified material and determine if there is a change in the composition, manufacturing process, or quality that may affect its durability or performance. In case of variance, the Department's tests will govern.

- 4.3.2. **Failure.** Producers not qualified under this Specification may not furnish materials for use on Department projects.

Producers failing to qualify may submit a request for re-evaluation after 12 mo. have elapsed from the date of the original request. MTD may modify this time limit at its discretion. In the request for re-evaluation, document the cause of the issue and corrective action taken.

The Department normally bears the costs of sampling and testing; however, the producer will bear the costs associated with materials failing to conform to the requirements of this Specification. The Director of MTD will assess this cost at the time of testing, and amounts due will be billed to the producer.

- 4.4. **Periodic Evaluation.** The Department reserves the right to conduct random sampling and testing of pre-qualified materials to verify performance and Specification compliance and to perform random audits of documentation. Department representatives may sample material from the manufacturing plant, machine shop, assembly location, project site, or warehouse.

Failure of materials to comply with the requirements of this Specification as a result of periodic evaluation may be cause for removal of those materials from the MPL. In case of variance, the Department's tests will govern.

- 4.5. **Disqualification.** Causes for disqualification and removal from the MPL may include, but are not limited to:
- two consecutive project or random samples of the same type, model, bar size, and grade of coupler fail to meet the requirements of this Specification,
 - falsification of documentation,
 - producer fails to report any change in material composition, manufacturing process, or assembly instructions to MTD,
 - material fails to meet the requirements of this Specification as a result of periodic evaluation, or
 - producer has unpaid charges for failing samples.

MTD will remove disqualified producers from the MPL and will not allow submission of material for re-qualification for 12 mo., at the discretion of the Department.

- 4.6. **Re-Qualification.** Once the disqualification period established by MTD has elapsed, producers disqualified and removed from the MPL may begin the re-qualification process by submitting a request in accordance with Section 4.1, "Pre-Qualification Request," including additional documentation identifying the cause of the problem and corrective action taken. The re-qualification process will then follow all subsequent Sections of Article 4, "Pre-Qualification Procedure."

The Department normally bears the costs of sampling and testing; however, the disqualified producer will bear the costs associated with re-qualification. The Director of MTD will assess this cost at the time of re-evaluation, and amounts due will be billed to the producer.

5. PROJECT SAMPLING AND TESTING

Project sampling of mechanical couplers is required for every Department project in which mechanical couplers are used.

- 5.1. **Project Sampling.** The Department will sample in accordance with [Tex-743-I](#).
- 5.2. **Project Testing.** The Department will test project samples in accordance [Tex-744-I](#)
- 5.3. **Evaluation.** The Department will accept or reject lots for a given Department project based on test results from two properly sampled and tested project specimens.

If one project specimen fails to meet the requirements of Article 6, "Material Requirements," the Department will conduct additional project sampling and testing. The remaining original project specimens will be discarded. The Department will sample additional project specimens in accordance with [Tex-743-I](#). The Department will notify the Contractor and coupler producer of the failed project sample before collecting the second project sample.

If any of the additional project specimens fails to meet the requirements of Article 6, "Material Requirements," the Department will reject the entire lot of mechanical couplers.

6. MATERIAL REQUIREMENTS

- 6.1. **General Requirements.** All mechanical couplers must be of uniaxial design and must be one or a combination of the following types:
- sleeve-filler;
 - sleeve threaded;

- sleeve swaged; and
- sleeve shear screw.

Each component of the mechanical coupler must be die-stamped or permanently labeled to identify:

- bar size and grade for which the coupler is designed;
- manufacturer and model identification;
- production lot number; and
- date of manufacture.

Note: "ID Codes" traceable back to the above required information are acceptable.

Any person that machines, assembles, or installs the couplers must properly follow the instructions provided by the manufacturer.

- 6.2. **Test Requirements.** Each mechanical coupler assembly must be tested for slip, fatigue, and ultimate tensile strength. All three tests must be performed on the same assembly.
- 6.2.1. **Slip.** The total average slip must not exceed 0.010 in. for No. 14 bars and smaller or 0.030 in. for No. 18 bars and larger. Slip is tested in accordance with [Tex-744-I](#), Section 4.2., "Slip."
- 6.2.2. **Fatigue.** The mechanical coupler assembly must withstand a minimum of 80,000 cycles. Fatigue is tested in accordance with [Tex-744-I](#), Section 4.3., "Fatigue."
- 6.2.3. **Ultimate Tensile Strength.** The mechanical coupler assembly must develop at least 125.0% of the minimum required yield strength in tension of the bar of the lowest grade. Ultimate tensile strength is tested in accordance with [Tex-744-I](#), Section 4.4., "Ultimate Tensile Strength."

7. SHIPPING

- 7.1. **Documentation Required with each Shipment.** Provide the following documentation with each shipment. Maintain copies of this documentation and make available to the Department upon request.
- Completed [Form 1818](#) (a.k.a. Form D-9-USA-1), "Material Statement," with the proper attachments for the mechanical couplers;
 - mill test report for the steel used to produce the mechanical coupler; and
 - written assembly and installation instructions provided by the manufacturer to contractors for each type, model, bar size, and grade for which the coupler assembly is designed, including a list of required tools, bar preparation, and necessary torque ranges for proper assembly and installation.

8. ARCHIVED VERSIONS

Archived versions are available.